

EFFECT OF AZOTOBACTER INOCULATION ON RUBBER SEEDLINGS

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Five isolates of *Azotobacter* collected from different regions of Kerala were studied for their survival in rubber (*Hevea brasiliensis*) plantation soil and for their nitrogen fixing capacity at different pH levels. Only two survived in soil at pH 4.8. One isolate showed more nitrogenase activity from pH 4.5 to 6 and was studied for its effects on growth of rubber seedlings when used in combination with different levels of the recommended dose of urea. The girth of seedlings which received 50 per cent of recommended dose of nitrogen with *Azotobacter* inoculation was comparable to plants which received 100 per cent of the recommended dose alone. *Azotobacter* inoculation augmented the population of various microorganisms in the rhizosphere of rubber seedlings.

Key words : *Azotobacter*, *Hevea*, Microbial population, Nitrogenase activity.

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INTRODUCTION

Microorganisms have an important role in improving the supply and availability of nutrients for crop plants. They serve as useful components of integrated plant nutrient supply system (IPNS). *Azotobacter* is a well known free living heterotrophic bacterium which plays an important role in crop production. *Azotobacter* fixes molecular nitrogen (N) and also produces auxins, vitamins, growth substances and antifungal antibiotics (Rao, 1988) and thus helps in plant growth. Encouraging results have been reported with *Azotobacter* inoculation in cereals and vegetables (Wani, 1990). Rubber growing soils are generally poor in the population of *Azotobacter* sp. The acidic nature of these soils necessitates inoculation with acid tolerant strains of this bacteria. This study was undertaken to isolate an acid tolerant strain of *Azotobacter* sp. with efficiency in N fixation and to study its

effect on growth of rubber seedlings.

MATERIALS AND METHODS

Soil samples were collected from 30 different locations of rubber growing areas spread from Kanyakumari district in Tamil Nadu to South Canara district of Karnataka and *Azotobacter* spp. were isolated by dilution plate method using Jensen's agar medium. To study the survival of the isolates in soil, 500 ml of culture broth containing 10^8 cells/ml was inoculated to soil (pH 4.8) in an area of 1 m² at the Rubber Research Institute of India Experimental Farm during March 1993. Soil sampling was carried out during pre-monsoon, mid-monsoon, post-monsoon and summer periods and *Azotobacter* population assessed.

Nitrogen fixing capacity of the cultures at different pH was studied by measuring acetylene reduction activity (ARA) by gas chromatograph technique. The isolates